DOCUMENT RESUME

ED 071 065 CS 000 346

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TITLE The Effects of Impulsivity on the Reading Achievement of Disadvantaged Students.
PUB DATE Jan 73
NOTE 78p.; M.Ed. Thesis, Rutgers University; The State University of New Jersey

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Covert Response; *Disadvantaged Youth; Grade 3; Overt Response; *Reaction Time; *Reading Achievement; Reading Habits; Reading Processes; Response Mode; *Response Style (Tests); Thought Processes; *Time Factors (Learning)
IDENTIFIERS Elementary Metropolitan Reading Test; *Impulsivity

ABSTRACT

This study extends previous research done on the impulsivity-reflection dimension whereby it was determined that children who are impulsive tend to report the first response that occurs to them, while reflective children delay before answering (considering the alternative solutions to problems with high response uncertainty); and that disadvantaged children are more impulsive than their middle class counterparts. This study was designed to determine whether the variable impulsivity affects the reading achievement of disadvantaged students on a group standardized reading test. First, 34 third grade disadvantaged subjects were given Form F of the Elementary Metropolitan Reading Test under the Standard Condition (allowing for impulsivity). A week later they were retested with Form G of the same test under the Imposed Latency Condition (to control for impulsivity). This time the subjects were not allowed to answer until told to do so, and they were instructed to think over the alternative possibilities before answering. An analysis of the data indicated students scored significantly higher under the Imposed Latency Condition on the Word Knowledge Test, the Reading Test, and on the total test score. (Author/HS)

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ED 071065

THE EFFECTS OF IMPULSIVITY ON THE READING ACHIEVEMENT OF DISADVANTAGED STUDENTS

A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS UNIVERSITY

THE STATE UNIVERSITY OF NEW JERSEY

BY

BARBARA BRENNER

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

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ACKNOWLEDGMENTS

Grateful appreciation is extended to Dr. Martin Kling for his interest and guidance.

To my husband and my sons deep appreciation is expressed for their patience and encouragement.

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ABSTRACT

Problem

Investigators have demonstrated the intra-individual stability and inter-task generality of the disposition labeled reflection-impulsivity. Children who are impulsive tend to report the first hypothesis that occurs to them while the reflective child delays before answering, considering the alternative solutions to problems with high response uncertainty. Impulsive responses are often of poorer quality, and disadvantaged children have been found to be more impulsive.

The main problem was to determine whether the variable impulsivity affects the reading achievement of disadvantaged students on a group standardized reading test.

Procedures

In order to determine whether impulsivity is a variable to be considered in the reading achievement of disadvantaged students, the study examined the responses of two testing conditions. A group of 34 third-grade disadvantaged students (18 girls and 16 boys) were given the Elementary Metropolitan Reading Test under the Standard Condition, that is, in the manner outlined in the test manual. One week later the students were retested with a comparable form but this time with an Imposed Latency

Condition so as to control for impulsivity. The students were not allowed to answer until told to do so, and they were instructed to think over the alternatives before answering.

Results

A matched pairs *t* test was performed to determine whether any significant differences occurred between the two testing conditions. The data supported the hypothesis; impulsivity did hamper reading achievement.

On the Word Knowledge Test, Reading Test, and Total Test scores the students scored significantly higher ($p < 0.01$) under the Imposed Latency Condition where the students were forced to inhibit their impulsivity. There were no statistically significant sex differences.

Conclusion

A modification of the administration of the Elementary Metropolitan Achievement Reading Test emphasizing an Imposed Latency Condition dwelling on reflectivity as compared to the standard administration yielded statistically significantly higher reading achievement (6 months) for a group of disadvantaged third-grade students.

CHAPTER I

INTRODUCTION

Background of the Problem

The growing body of research evidence shows a lack of adequate reading achievement on the part of disadvantaged students. Entwisle (1968) states that there are large social class differences in problem-solving strategies. Differences in the quality of problem solving among children have been attributed to adequacy of conceptual skills and motivational variables, but Kagan (1966) contends that other cognitive processes are part of the problem-solving activity. One of these processes deals with the degree to which a child reflects over the adequacy of solution hypotheses.

> There has been a tendency to overlook the individual differences in the processing of information, differences in the aspects of stimuli that are initially selected for labeling and the degree of reflection attendant upon classification of events or the selection of solution hypotheses [Kagan, Rosman, Day, Albert, & Phillips, 1964, p. 1].

This paper deals with the variable labeled reflection-impulsivity and its effect on the reading achievement of disadvantaged students. The relation of reflection-impulsivity to quality of performance only obtains for

problems having response uncertainty, and it has been shown that impulsive responses are of poorer quality than those preceded by longer latencies. This dimension affects reading performance as when a child reads, he is learning effective problem-solving strategies. He is confronted with a discrimination problem with high response uncertainty. For example, the word "donkey" elicits several solution possibilities, and the child may or may not pause to "consider their differential validity before responding [Kagan, 1965]."

Investigators have demonstrated the intra-individual stability and intertask generality of this disposition. A child's performance on a visual recognition task called the Matching Familiar Figures Test (MFF) is the primary index of a child's position on this dimension. The child is shown a picture of a familiar object and six similar variants. The child must select the one variant that is identical to the standard. The variables scored are response time to the child's first answer and the total number of errors across the 12-item test. Impulsive children in grades 1-4 were found to have a mean response time between 4 and 10 seconds and 15-20 errors, while reflective children were found to have a mean response time between 30 and 40 seconds and 2-6 errors (Kagan, 1966). Since this disposition is a basic component of a child's

behavioral organization, it is necessary to understand the antecedents of this disposition. Kagan feels that degree of involvement in tasks, expectation of failure, as well as constitutional predispositions are all possibilities to be considered. Since Schwebel (1966, 1970) has found disadvantaged students to be more impulsive, this study investigates some of the problems the disadvantaged student faces which may affect the reflection-impulsivity dimension.

Statement of the Problem

This study is concerned with the effects of impulsivity on reading test scores of disadvantaged students. The hypothesis of this study is that if one alters the administration procedure of the reading test so as to regulate the impulsive response style of disadvantaged children, thus allowing them to utilize their intellectual resources more fully, they will perform above their usual level.

In order to determine whether impulsivity is an important variable in the reading achievement of disadvantaged students, the study examined the responses of two testing conditions. A group of 34 disadvantaged third-grade students were given the Reading Test from the Elementary Battery of Metropolitan Achievement Tests under the Standard Condition. In another session the same

students were administered a different form of the same reading test, but this time with an Imposed Latency Condition where the students were encouraged to think before they answered. The study determined whether there is a difference in test scores when the child is given time to reflect over alternative hypotheses.

Definition of Terms

Disadvantaged. Children from the lower socio-economic strata who live in impoverished social and economic conditions in the city. In this study the disadvantaged will refer to students who are entitled to receive Title I benefits in the New Brunswick school system.

Reflection. The consideration of alternative solution hypotheses when many alternatives are available simultaneously. Reflection does not refer to delay that is the result of timidity, fear of failure, or inability to generate any solution.

Impulsivity. Selecting and reporting of solution hypotheses quickly with minimal consideration for their probable accuracy.

Standard condition. Administration of a test in the manner outlined by the test authors in the test manual.

Imposed latency condition. Administration of a test in which a student is not permitted to answer each question until he is instructed to do so by the tester.

In this condition the student is encouraged to think about the alternative hypotheses before answering.

Limitations of the Study

Before drawing any conclusions from this study, certain limitations should be considered:

1. A disadvantaged population sample was given a "middle class" reading test, and this may affect the validity of the test for this population sample.

2. The testing instrument, the Elementary Reading Test of the Metropolitan Achievement Tests, is a group reading test, and thus the results must be viewed with caution. A group test is not as reliable as an individual reading test.

3. This study is concerned with students of low socioeconomic status as assessed by Title I eligibility in New Brunswick. The eligibility determination for Title I students varies from school district to school district. A student might be considered disadvantaged in one school district but not in another.

4. The sample population of the study is small and drawn from students in one elementary school.

Importance of the Study

This study extends the previous research done on the impulsivity-reflection dimension. Research has shown

that children have a conceptual tempo, and this response style has shown intra-individual stability over time and across tasks. Schwebel (1966) found that lower-class children (ages 9-12 years) are more impulsive, and thus their responses are of poorer quality than middle-class children when compared on four standard verbal tasks. This present study provides further data on the effects of impulsivity on the performance of verbal tasks in lower-class children.

Overview of the Study

Chapter II surveys the literature in two sections. The first part describes some of the variables affecting the impulsivity-reflection dimension among disadvantaged students, and the second part reviews representative studies dealing with impulsivity and school achievement.

Chapter III describes the procedures including criteria for selection of the subjects, tests, and the statistical design.

Chapter IV presents the data and a discussion of the findings.

Chapter V summarizes the findings, draws conclusions, and makes suggestions for further research in the area of impulsivity and reading.

CHAPTER II

REVIEW OF THE LITERATURE

For convenience, the review of the literature is organized into two major areas. The first area concerns background factors affecting the impulsive attitude among disadvantaged students. The second major area deals with empirical studies assessing impulsivity as a variable in school achievement. More specifically, the first area is divided into five sections including (1) values, (2) motivation, (3) restricted experiences, (4) language facility, (5) self-image. The second area deals only with empirical studies on impulsivity.

Background Factors

Values

A major problem the disadvantaged student faces when he comes to school is one of values and goals that are markedly different from the prevailing middle-class values. The school is permeated with middle-class values and the lower-class child often finds himself in a strange and hostile environment. "The more constricted an individual's social frame of reference and the greater its distance from the cultural mainstream, the less meaningful

and the less effective are the dominant cultural values that impinge on him in the schools and other social institutions [Deutsch, 1960, p. 3]."

The lower-class culture emphasizes a different set of focal concerns that are often in conflict with the norms of the school. These include: staying out of trouble, toughness, smartness, excitement, fate, and autonomy (Kvaraceus, 1966). The school norms, on the other hand, reflect the Protestant ethic. Ambition, resourcefulness, self-reliance, individual responsibility, cultivation of skills, subordination of immediate satisfactions in the interest of long-range goals, rationality, manners, and control of physical aggression are highly prized attributes. The ability to conform to these norms is not a simple effort of will. Conformity comes easily when the child has internalized these norms because he has grown up in a home which has emphasized them (Cohen, 1955).

Middle-class socialization is conscious, rational, deliberate, and demanding. Little is left to chance and just growing. Middle-class parents are anxious about their child's achievement and this anxiety is communicated to the child. The child is aware of what his parents want him to be and to become, and he is powerfully motivated to conform to these parental expectations. The child comes from a home where he is rewarded for finishing a task and

is encouraged by his parents. He is motivated from within and has acquired the ambition and desire to learn (Klaus & Gray, 1965).

Lower-class socialization is relatively easygoing. The child's activities are governed by his own personal inclinations, his parents' convenience, and unpremeditated impulses, and by requirements of the household. They are less likely to be governed by exacting specifications of effort and achievement which are regarded as good in themselves, and they are not taught to forego immediate gratification for a potential future gain. Thus, they do not learn to understand and accept scheduling and time and order; and the reduced physical activity and the demands for long spans of attention in the school put them at a disadvantage (Cohen, 1955). "As the child interacts with members of his family group, he internalizes the expectations of these important people and their values become his [Smith, 1967, p. 179]." School becomes an experience for many of the disadvantaged which is discontinuous with the values, preparation, and experiences they receive from their home and community (Deutsch, 1960). These factors may have a definite influence on the child's tendency towards impulsivity. Kagan (1966) states that impulsive children make more errors because they do not take time to pause to evaluate the quality of their inferences.

They report the first reasonable idea that occurs to them often because they have difficulty placing effective inhibitions on their tendency towards action. They find it hard to block the urge to blurt out an answer even though they are not sure it is correct. The impulsive child is more controlled by the positive value of quick success rather than by the anxiety generated by the possibility of committing an error.

Motivation

Along with the problem of differing normative systems comes the problem of motivation. For many disadvantaged children coming from homes struggling to maintain a minimum level of subsidence, the goal of education must seem remote (Block & Neiderhoffer, 1958). The basic needs of a child must be satisfied before he can perform higher level functions. A deficiency in basic needs influences motivation and learning. With the energy and attention of the child being directed to immediate needs, there is a low level of endurance for the demanding task of learning, and the satisfaction of immediate goals becomes far more central in his conception of things (Bloom, Allison, & Hess, 1965). The educational system is an effective agency in teaching good work habits to middle-class children, but it fails to motivate the disadvantaged as schools and society lack real rewards. The slum

child is frustrated by the school's demands and lack of rewards and sees little relevance in school learning for the realities he perceives (Cloward & Ohlin, 1960). Kagan et al. (1964) state that a high degree of involvement in the task influences the reflection dimension. A child who is motivated and who has high standards of performance should be more likely to reflect on alternative hypotheses than the child who cares less about the quality of his product.

One strong influence on a child's level of aspiration is the level of expectations which he perceives others hold for his behavior. Becker (1951) in his study of teachers in Chicago found that teachers look with favor on the quiet, cooperative, well-behaved child who makes their job easier. They described the lower-class child as most difficult to control and reach as he was given to unrestrained, restless, impulsive behavior. Many of the teachers felt the lower-class students lacked interest in school and had different learning abilities. The teachers felt successful with the middle- and upper-class children and felt failure with the disadvantaged. Thus the teachers expect less of the disadvantaged student, and the problem is aggravated in each grade as the gap between what the student should know and what he actually knows becomes wider and wider.

Restricted Experience

The disadvantaged student comes to school with a restricted background of experiences and concepts which make the middle-class curriculum unrealistic. He usually has not traveled beyond the small radius of his neighborhood. Since his parents have the same experiential poverty, the child has no guidance in the perception of things he has experienced.

> It is possible to have experience but for this experience to yield very little in terms of a significant body of meaning or concepts. Mere sensory contact is rarely enough. Rather, this contact must be accompanied by a kind of directed perception which will be consumated in the formation of meaningful concepts [Edwards, 1965, p. 546].

The disadvantaged child meets limited variability in the kinds of problems he meets and has little opportunity for his cognitive powers to be stimulated. He does not come from a home where he is asked questions and is challenged to explore his environment (Dale, 1965). Bee (1969) found that a middle-class mother allows her child to work at his own pace while she offers suggestions on how to search for solutions, thus helping the child to become a successful problem-solver. The middle-class mother tells the child what he is doing that is correct and gives more accurate answers. The lower-class mother, on the other hand, often makes more disapproving comments and more highly specific suggestions which do not help to

develop basic problem-solving techniques. A lower-class child is usually told to do something without being shown the cause-and-effect relationship. There is often a scarcity of objects including books, toys, puzzles, and the like. The presence of these objects increases the child's familiarity with the tools he will use in school (Deutsch, 1960). Milner (1951), in her study of first-grade children, found that children of high reading ability came from a higher family social status. These children had a richer verbal family environment and had more opportunity for emotionally positive interaction with their parents. They had more books available to them and were read to by personally important adults more than the lower-class children. Mealtime for the higher-class children served as a focus for positive family interaction high in verbal content. The lower-class children's mothers discouraged or prohibited children's chatter, and the children had limited opportunity to interact verbally with adults. Hess and Shipman (1965) found that lower-class mothers do not permit their children enough time to formulate alternative hypotheses. Entwisle (1968) states that in reading a child is learning to decode messages, and he must make use of many kinds of cues, and thus he must be able to formulate and test hypotheses about the messages.

> At least when the child is cognitively attuned to uncertainty, he comes with the expectation that

> alternative behaviors are "good" and not "wrong." If he has been encouraged to explore his environment, he may search all over the page or mentally generate and reject possibilities to "explain" the written symbols [Entwisle, 1968, p. 38].

Language Facility

Wakefield (1969) feels that "oral language patterns of the low-socioeconomic Negro, Spanish surname and Anglo children are thought to be sufficiently different from the middle class American children to cause difficulty in the learning process [p. 622]." The child's verbal development is laid in the general cultural level of his home through the language patterns of his parents and associates. The language problem thwarts attainment of even minimal academic goals. The standard English usage of the teachers and the textbooks is an alien tongue. These children are exposed to a different dialect of English and thus to a different system of speech sounds and really must almost learn a second language.

On the other hand, the middle-class child is used to the language of the textbook (Newton, 1962). He learns to use language to fix aspects of the world in his memory; he is encouraged to think about similarities, differences, and relationships in the environment. His instruction is often individual and his parents motivate, reward, and reinforce the desired responses. The middle-class child "learns to learn" very early (Bloom et al., 1965).

The disadvantaged child often lives in an extended family where the living conditions are characterized by overcrowding in substandard quarters. Strom (1965) feels that there are certain psychological consequences which often result from crowded living conditions. Persistent crowding from early life adversely affects self-sufficiency, ability to be alone, and sense of individuality. A child having been denied privacy and the development of an interest in solitary pursuits cannot be expected to engage easily in the kinds of study habits required for school.

Another problem resulting from overcrowding is "mental strain." The slum child always being around people has to guard constantly his status preserving wall. Often in school he is tired and preoccupied by autistic thinking as an attempt to shut out the external world. Crowding also hinders the development of decision-making activities. Choice is seldom a major determinant in slum living, but rather circumstance is often the deciding factor. With lack of money, skills, and attitudes necessary to register change, the disadvantaged child often feels he is driven by fate. With few alternatives for action at home, the child finds it difficult to undertake any deliberative or decision-making tasks in the class. The motivation to inquire or to demonstrate curiosity is retarded by experiences in the home.

Self-Image

Deutsch (1965) did a four-year study on verbal behavior with 292 children and found that lower-class children are subject to a "cumulative deficit phenomenon" which takes place between the first and fifth grades. This deficit becomes more marked as the child progresses through school, and thus it is not surprising to find many disadvantaged children making poor adjustments in school and developing negative self-systems. Entering the school poorly prepared to meet the demands of both the learning process and the behavioral requirements of the classroom, initial failures are almost inevitable and the school experience becomes negatively rather than positively reinforced (Deutsch, 1964). Neugarten (1946), in a study of Hometown, found that the lower-class child has the reputation of being poorly dressed, unpopular, of not liking school, and of being bad mannered. Warner (1949) found that taking children of all classes with equal intellectual ability, a large percentage of those from the lower class would drop out of school before the sophomore year. As his increasing failure becomes apparent to the child, he becomes more and more alienated from the school program.

Schwebel and Bernstein (1970) feel that in order for a child to perform a particular behavior he must have the appropriate cognitive skills as well as a healthy

self-attitude. The lower-class child experiencing frequent failure in his transactions with his school environment develops a negative self-attitude, and this often leads him to evolve an adaptively defensive stance. Thus, the child with a history of failure responds impulsively--he attempts to answer without pausing to devote sufficient time to think. They state that impulsive responding is defensive "because the disappointment of erring should be less disturbing to one who has committed only minimal effort towards succeeding [p. 630]." Impulsive responding is adaptive because it helps lessen anxiety, but it is maladaptive because it interferes with effective problem solving. The impulsive child implementing the first idea that occurs to him is more likely to end up in failure which results in anxiety.

> As a result of the increased anxiety his selection and evaluation of a second solution path is apt to be impaired, and the probability of success attenuated. This maladaptive cycle may become entrenched with time and after 5 years of experiencing the sequence: problem → impulsive selection of invalid solution sequence → failure → anxiety → selection of second sequence . . . → failure . . . etc., the child may gradually withdraw involvement from problem situations and become apathetic or hostile toward intellectual situations [Kagan et al., 1964, p. 35].

The preceding dealt with some of the factors that may account for this tendency towards impulsivity found in many disadvantaged students. Entwisle (1968) states:

> Taking this evidence altogether what one sees is greater cognitive flexibility in the middle class

> child--he concentrates on details when necessary, but tries and retries solutions until a satisfactory and integrative solution is found. This is exactly what reading requires [p. 40].

Following will be a discussion of some of the actual studies dealing with the reflection-impulsivity dimension.

Reflection-Impulsivity Studies

Kagan, Moss, and Sigel (1963), in their investigations with children in grades 1-4, found that some children show a preference for analytic conceptual groupings. An analytic concept is based upon shared similarity in a particular objective component among a set of stimuli such as animals with one ear or people with hats on. The Conceptual Style Test (CST) was used to measure this preference for analytic conceptualizations. The test consisted of 30 cards each with three drawings of familiar objects, and the child had to pick out the two pictures that went together in some way and to state the basis for the grouping. Results showed the consistency of an analytic attitude across situations, and results also revealed two more fundamental cognitive dispositions are the primary determinants of the production of analytic concepts. These are the tendency to reflect over alternative solutions in which several response alternatives are available and the tendency to analyze visual arrays into their component parts.

Further corroboration of these two tendencies was

also found in eight separate studies (Kagan, Rosman, Day, Albert, & Phillips, 1964). The first study on first- and second-grade boys found that an analytic attitude appears in a variety of tasks with widely different intellectual requirements including articulation of ink blots, Picture Arrangement subtest of WISC, and HFT performance. They also concluded that analytic concepts are independent of vocabulary and are produced following reflection over alternative responses. Evidence for this was supported by reaction times to analytic concepts which were noticeably longer than response times to other classes of concepts. The mean reaction times were 5.8 seconds for boys and 6.9 seconds for girls. The reaction times for relational concepts, the most frequent response category, were 3.9 seconds for boys and 4.6 seconds for girls. This difference in reaction times to analytic versus relational responses was statistically significant.

In the second study, second-grade children were assigned to one of two experimental groups, and they were administered the CST, Hidden Figures Test (HFT), and the Design Recall Test (DRT). In the DRT, a geometric design was presented for study, removed for 15 seconds, and then presented along with the variants and the standard. The subjects had to select the correct design. One group was instructed to respond quickly while the other group was

instructed to respond slowly and to reflect upon their answers. As was predicted, the children in the slow instruction group produced more analytic concepts on the CST and made fewer errors on the DRT and the HFT. Therefore, experimental manipulation of the tendency to reflect upon alternative solutions does affect analytic concepts and perceptual-recognition errors.

In the third study, second- and third-grade children were administered the CST, DRT, and several related tests and then were retested nine weeks later. These children showed a stable tendency toward delay versus impulsivity in reporting solution hypotheses, and this tendency was consistently related to low versus high error scores on DRT. In the Draw-a-Face Test (DAF), it was found that there was no relationship between the number of face parts drawn and IQ, and the number of face parts drawn was related to long response times on CST. The child who reflects is apt to include more face parts than the child who impulsively draws what first occurs to him and fails to reflect on the completeness of his product. "Differences in cognitive products should not always be attributed to differential knowledge, but may be a consequence of differences in the maturity of the response systems the child uses to communicate . . . [Kagan et al., 1964, p. 18]."

In the fourth study, visual analysis again was a determinant of analytic groupings. A sample of 57 fourth-grade boys were administered the CST and a measure of visual analysis. There was a positive correlation between analytic concepts and the tendency to analyze the geometric stimuli into distinctive figural and background components.

In study five, the third- and fourth-grade subjects from study three were administered new tests of visual analysis and reflection-impulsivity, and the scores were correlated with the earlier measures of reflection-impulsivity. Instead of using the DRT, a new task of reflection, the Matching Familiar Figures (MFF), was used. In the MFF, the stimuli were familiar objects (boat, telephone) instead of geometric designs, and the MFF did not require memory as did the DRT. The standard and variants were presented simultaneously, and the subject had to select the variant that was identical to the standard. Response times and error scores on the DRT task were related to response time and errors on MFF one year later.

Study six assessed what effect impersonal versus reassuring testing conditions would have on the reflection-impulsivity dimension among third-grade children. There was no consistent difference in errors or response time on three different tasks between the students examined under cold versus warm testing conditions. However, there was

marked intra-individual consistency in response time and errors across the three tasks supporting the concept of conceptual tempo.

In study seven, 34 boys and 22 girls from the Fels Research Institute were administered a battery of tests and the negative relation between analytic concepts and impulsive responding was again supported.

In study eight, data were obtained on the relation between distractability or restlessness and conceptual impulsivity. In the first study, each child was observed in his classroom. The ratio of task attention to distractability discriminated the impulsive and non-impulsive children. The impulsive students often displayed momentary lapses of attention when working at school tasks. The reflective children showed less distractability during conceptual tasks and seemed capable of greater concentration. When observing the free-play behavior on the playground, the investigators found impulsive boys to have more frequent gross motor activity. From study seven, 27 of the 34 Fels boys had been observed extensively from birth to age eight. Boys who scored high on analytic concepts had less spontaneous gross motor behavior during ages four through eight, and were also involved in solitary task-oriented behavior during both ages 0-4 years and 4-8 years. The fact that ratings of solitary involvement

in tasks during the first four years of life predicted analytic concepts four years later suggests that many of the critical antecedents are present early in development. Thus, the link between behavior during the first five years and an analytical attitude in school suggests that the early learning and environment of the disadvantaged child may play a role in this reflective-impulsive dimension.

After Kagan consistently found high negative correlations between response latency and frequency of recognition errors in discrimination tasks that use either geometric designs or familiar objects, he then assessed the validity of the hypothesis that reflective children would commit fewer word recognition errors. The purpose of this study (Kagan, 1965) was to determine if measures of reflection-impulsivity obtained in first grade would be prognostic of reading performance one year later. Indexes of reflection-impulsivity including the Design Recall Test (DRT), Haptic Visual Matching (HVM), and the Matching Familiar Figures (MFF), as well as a letter-recognition and word-recognition test were administered to 65 boys and 65 girls in first grade. Children who displayed long decision times and low error scores on the MFF were most accurate in recognition of words. The relation between fast decision times and reading errors was better for

high-verbal than for low-verbal students as the low-verbal students had acquired minimal reading skills. With the low-verbal students, lack of a basic ability to read rather than a preferred conceptual strategy was the main determinant of reading errors. "Response uncertainty is minimal when no solution hypotheses are elicited, and under these conditions reflection is no advantage [Kagan, 1965, p. 66]." The students were seen in the spring of their second year in school. They were again administered the MFF and each student was administered four paragraphs to read aloud. Ten types of errors were recorded. Partial-identity errors, meaningful and non-meaningful substitutions, and suffix errors were regarded as impulsive errors; as in each, the child has an hypothesis about the word but offers an incorrect response. These error scores, along with the total error score, were correlated with the indexes of reflection-impulsivity gathered in first grade. The results showed that children classified as impulsive in first grade had the highest reading error scores at the end of second grade. Kagan states that it is not clear why MFF errors were a better predictor of reading performance among girls and the MFF response time was a better predictor among boys. This study also found a very high relationship between the number of head-eye fixations of the standard and the mean response time. This indicates

that students with long response latencies are "actively considering alternative answers during the delay period and are not merely paralyzed in their seats [Kagan, 1965, p. 625]." Kagan strongly suggests that the child's tendency to make fast decisions in problems with response uncertainty is one determinant of the quality of reading performance. "It is possible that therapeutic procedures designed to extinguish the child's tendency to report hypotheses impulsively should improve reading performance [p. 627]."

Kagan, Pearson, and Welch (1966) did a study with first-grade children (79 boys and 76 girls) to assess reflection-impulsivity and performance on three inductive reasoning tests. Indexes of impulsivity included the MFF and the HVM tests. The three reasoning tests were the Picture Completion Reasoning Test, the Extrapolation Reasoning Test, and the Guessing Objects Test. The vocabulary and information scale of the WISC were administered, and the child was also asked to evaluate his performance of the tests. Results showed that there was good generality for both response time and errors across the MFF, HVM, and the reasoning tests with higher consistency among girls than boys. These sex differences show that girls display greater intertask consistency for the reflective-impulsive attitude. Errors on the MFF were negatively

correlated with WISC verbal-scale scores but response time to MFF was independent of verbal ability. The relation between reflection and accurate performance on the inductive reasoning tests held even when verbal ability was statistically controlled. In the self-evaluation, decision time was longer for reflective children. This has implications for investigators who use self-rating information in personality research. Since reflective children take longer to decide about self-evaluative statements, their self-descriptions may be more accurate. The data on head-eye fixations showed a very high relation between the number of fixations and response time prior to the first solution hypothesis. The coefficients were .81 for boys and .96 for girls. Also, those who made many fixations prior to the first hypothesis also made more fixations between their first and second hypotheses. The length of time the child studied the six variants was highly correlated with the total number of fixations prior to the first hypothesis and with a reflective attitude. Thus, reflective children made more fixations of the standard and also spent more time studying the six variants. All phases of stimulus processing were faster for the impulsive children.

Kagan, in another study (1966), investigated the relation between impulsivity and errors of commission on a

serial learning task. He also tested the hypothesis that there would be greater deterioration in serial learning performance for reflective children due to a communication that suggested the strong possibility of future failure. Third-grade children (136 boys and 107 girls) were classified as either reflective or impulsive and were administered a serial learning task under three different conditions. The subjects heard each list on a tape recorder and then had to recall the words from memory. Each list contained six words that belonged to a conceptual category and six words that were conceptually unrelated. After administration of two lists, the first group (rejection group) was told that their performance was poor, the second group (threat group) was told that the next lists were difficult, and the controls were given no special instructions. The relationship between recall of concept and non-concept words in the first two lists was high for reflectives and low for impulsive children. There was a negative relationship between recall and intrusion errors --the higher the recall score, the lower the number of intrusions. Impulsive children had more intrusion errors than reflectives on all four tests and did not recall as many words. Kagan did find some support, though not statistically significant, for the idea that reflective children were more influenced by the instruction that suggested

the possibility of future failure. Reflective children following threat showed the largest increase in intrusion errors while reflectives in the control group produced the smallest increase in intrusions. Reflective boys under threat recalled 4.9 fewer words on lists three and four than they did on the first two lists. One possible explanation for this, Kagan feels, is that impulsives produce the answer quickly for the positive value of quick success while the reflective child is anxious about committing an error. If a child's anxiety over error is much stronger than his desire for quick success, he will be reflective. Thus, a situation that creates anticipation of failure might lead to greater anxiety and greater task disruption in reflective children. Kagan is clear to differentiate anxiety over failure as discussed above from expectation of failure which is very often the disadvantaged child's position. "A child who has been exposed to chronic failure may enter into a problem situation with a strong anticipation of failure but minimal anxiety [Kagan, 1966, p. 19]." They do not expect to perform with competence and have learned to accept this state of affairs.

Schwebel (1966) explored the social class differences in language ability in four standard verbal tasks, and he found that these differences in part are a result of the greater tendency towards impulsivity in lower-class

(LC) subjects. The subjects were 15 lower-class and 15 middle-class caucasian males (ages 9-12 years). The first task, the Picture Description task (PD), was divided into a free latency and forced latency subtask. The descriptions were rated distinct or nondistinct (the examiner could not identify the referent). On the free latency pictures the LC subjects made 1.40 nondistinct responses, but they made only 0.33 on the forced latency subtask, thus demonstrating a significant improvement. On the second task, Events of the Day (ED), the subjects were asked to think during a forced latency period of ten seconds, and then they had to report their activities of the day. Middle-class boys reported their day's happenings in significantly fuller detail. The third task, Sentence Construction (SC), was divided into a free and forced latency subtask. Each contained groups of three words and the subjects were to incorporate the three words into a sentence. The middle-class (MC) subjects used significantly longer sentences. In the free latency task, the mean latency for the LC subject was 2.5 in contrast to the significantly higher 7.5 of the MC subjects. The LC subjects made significantly more mistakes, but on the forced latency subtask, they made significant improvement in sentence quality. In the fourth task, Grouping of Objects, the subjects were asked to sort two groups of

objects, and the LC subjects completed the assignment in significantly shorter time and used less categorical groupings.

Thus, the results of this study showed that LC subjects were not only handicapped by inadequately developed vocabularies but were also hampered by their impulsivity. "Apparently much that has been attributed to 'just class differences' in the past can be explained in terms of differences in this variable [Schwebel, 1966, p. 18]." The LC subjects responded significantly faster, and while the MC subjects showed no difference in performance of the free and forced latency subtasks, the LC subjects were more successful on the forced latency subtasks where their performance was almost comparable to that of the MC subjects. Schwebel described the LC subjects as being anxious to get started almost before the instructions were completed. Many did not listen to directions, and on the free latency tasks, they began without pausing to think.

Palkes, Stewart, and Kahana (1968) did a study with hyperactive children of normal intelligence with a mean age of 9 years 3 months to see if training in self-directed verbal commands would help improve performance. They hypothesized that training in the use of self-directed verbal commands would significantly decrease

impulsive behavior during performance of a task. The Porteus Maze Test was selected as Porteus and others have found that maze tests can be used to demonstrate a subject's impulsiveness and distractability. The Porteus Maze Test quotient score (TQ) is an estimate of general intelligence and the qualitative score (Q) based upon errors distinguishes between groups differing in impulsiveness. Ten subjects were in the verbal training group (VT) and ten were in the control or no training group (NT). The Porteus Maze Test Revision Series was administered initially as a pretest measure of impulsivity. Following the pretest, each subject was presented with a series of tasks which included the Matching Familiar Figures Test, Embedded Figures Test, and Trail Making Test. The subjects in the VT group were required to verbalize a set of self-directed commands before responding to a task or subpart of any task. The subjects in the NT group did the same tasks without the verbalization of the self-directed commands. After this training, the Porteus Maze Extension Series was administered to each subject. There was no significant differences in TQ or Q scores between the VT and NT groups on pretest measures, but the VT group obtained a mean posttest TQ score of 119 while the NT group obtained a mean score of 99. Thus, the use of self-directed verbal command training was effective in increasing the overall

performance. Comparison of pre- and posttraining performance for the VT group showed significant improvement in performance while the NT group did not show a change. The VT posttraining mean Q score was 38.4 while the NT score was 77.0. This difference demonstrates that instruction in self-directed verbal commands did reduce the number of qualitative errors. The "slapdash quality of performance demonstrated by both groups on pretesting was significantly altered for the self-directed command group after training [Palkes et al., p. 825]."

Schwebel and Bernstein (1970) did a study to test the effects of impulsivity on the performance of lower-class children on four WISC subtests. The General Comprehension and Similarities subtests from the Verbal Scale and the Block Designs and Mazes from the Performance Scale of the WISC were administered to 18 lower-class boys ranging in age from 9 to 14. First each subject was given one subtest from the verbal and one from the performance scale in the Standard Condition (SC), the one outlined by Wechsler. Then the subjects were given the other two tests in the Imposed Latency Condition (ILC), that is, several seconds had to elapse before the subjects were permitted to respond. Each subtest was administered to nine subjects under the SC condition and to nine others under the ILC condition. Latency periods imposed on the ILC subjects

were three or more times longer than those the former subjects had taken themselves. On all the tests except the Block Design the scores obtained by the subjects in the ILC condition were significantly higher. The mean standard score made by the subjects under each condition on each subtest was extrapolated and converted to a mean IQ. The mean IQ earned by the subjects on the Similarities subtest was 104 in the ILC, 87 in the SC; on General Comprehension, 116 in the ILC, 90 in the SC; on Block Design, 85 in the ILC, 87 in the SC; and in the Mazes 104 in the ILC, 82 in the SC. The ILC did not help the subjects on the Block Design as they could not plan a strategy to solve the entire problem. Strategy had to be planned in stages and changed as the blocks were manipulated and design construction progressed, and thus Schwebel and Bernstein feel that trial and error may be an effective problem-solving strategy here. In the SC the subjects seemed to report one of the first responses which came to mind while in the ILC the subjects used the imposed latency time to evaluate potential hypotheses and carefully formulated their responses. Thus, impulsiveness can significantly affect performance on intelligence tests.

Summary

The significance of a conceptual tempo variable for cognitive products has been demonstrated in the

literature. A series of investigations have shown the stability and intertask generality of a tendency toward fast or slow decision times to problems with high response uncertainty. A relationship between response latency and quality of performance was shown in tasks requiring visual recognition and analytic concepts, reading recognition ability, inductive reasoning, verbal abilities, and in tasks requiring the same types of skills as those of an intelligence test. It was also found that impulsivity affects the quality of performance on the Porteus Maze Test. Lower-class disadvantaged children have been found to be more impulsive, and thus the quality of their performance is often poorer. Some of the antecedents of this disposition among disadvantaged children include differing focal concerns and values, lack of motivation, poor preparation for learning and problem solving, poor language facility, and defective self-systems and low self-esteem. "A child who has been deprived of a substantial portion of the variety of stimuli which he is maturationally capable of responding to is likely to be deficient in the equipment required for learning [Deutsch, 1964, p. 177]." Thus, the reflection-impulsivity dimension is one variable that should not be overlooked in the area of reading.

Figure 1 presents the many variables as they appear to function in disadvantaged and middle-class youngsters.

Disadvantaged	Middle Class
I.	I.
Values are in conflict with school	Values are in harmony with school
A. Staying out of trouble, toughness, smartness, excitement, fate, physical aggression, autonomy.	A. Ambition, resourcefulness, self-reliance, rationality, individual responsibility, cultivation of skills, control of physical aggression.
B. Socialization is easy-going--governed by parents' convenience and requirements of household.	B. Socialization is conscious, deliberate, and demanding
II.	II.
Low motivation	Strong motivation
A. Satisfaction of immediate goals. Quick success.	A. Subordination of immediate gratification in the interest of long-range goals.
B. Sees little relevance in school tasks.	B. School tasks and school rewards have relevance to his reality.
C. Low teacher expectation.	C. High teacher expectation.
III.	III.
Restricted background of experiences	Enriched background of experiences
A. Limited variability in kinds of problems he meets.	A. Asked questions and is challenged to explore his environment.

(continued)

Fig. 1. Variables affecting the reflection-impulsivity continuum for disadvantaged and middle-class students.

Figure 1 (continued)

Disadvantaged	Middle Class
B. Not shown cause-and-effect relationships.	B. Helped to develop basic problem-solving techniques.
C. Limited opportunity to interact verbally with adults.	C. Emotionally positive verbal interaction with adults.
D. Feels driven by fate. Circumstance not choice-deciding factor at home.	D. Cognitively attuned to uncertainty. Given time to formulate alternative hypotheses.
E. Little opportunity for decision making and solitary pursuits.	E. "Learns to learn" early, opportunity for decision making and individual pursuits.
IV.	IV.
Standard English of school is alien	Used to language of textbook and teacher
V.	V.
Negative self-image	Healthy self-attitude
A. Cumulative deficit phenomenon--increasing failure with each grade.	A. School experience positively reinforced--prepared to meet the demands of the learning process and behavioral requirements of classroom.
B. Develops an adaptively defensive stance--responds impulsively.	B. Cognitive flexibility.

CHAPTER III

PROCEDURE

Introduction

To determine whether or not regulating the impulsive response style of disadvantaged students would increase reading test scores, the Elementary Reading Test for grades 3 and 4 from the Elementary Battery of Metropolitan Achievement Tests, Form F, was administered to the population sample under the Standard Condition (SC). One week later Form G was administered with an Imposed Latency Condition (ILC). The difference between the mean scores of the two testing conditions was computed to see whether or not there was any statistical significant difference. A significantly higher score under the ILC condition would suggest that when a child takes time to reflect over alternative hypotheses, his reading improves. No significant difference or a significantly higher score for the test given under the Standard Condition would suggest that controlling for impulsivity among disadvantaged students does not make a difference.

Selection of Subjects

Participating in this study were students enrolled in three third-grade classes in Washington School in New Brunswick, New Jersey. Since this study was concerned with the effects of impulsivity on the reading achievement of disadvantaged students, the first criterion established for selection of the students for the study was that they must be eligible for Title I. The Washington School district is considered a target area--that is, an area which has a high concentration of low-income families and thus is considered a Title I school. Information acceptable for labeling families as low-income comes from many sources, including information received from the 1970 census report. The report uses such things as home overcrowdedness in relation to income and employment statistics. Children eligible for free-lunch programs are eligible for inclusion in Title I, and children who receive funds under the Federal Aid to Dependent Children program are also eligible for inclusion in Title I.

The second criterion established for selection of students for the study was that they have a minimum reading grade level of 2.4 when they were tested on the Gates-MacGinitie Reading Test, Form B-1. The children were tested in grade 2.8 in May 1971.

On the basis of the criteria, 34 students (16

boys, 18 girls) were gathered from a group of 95 students in the three third-grade classes in Washington School, New Brunswick. The students' ages ranged from 9.2 years to 11.5 years with a mean age of 9.5. These students met the stated criteria--they are considered disadvantaged Title I children, and they scored a minimum of 2.4 reading grade level on the previous testing with the Gates-MacGinitie Test, Form B-1, in grade 2.8.

Selection of Test Instrument

In order to determine whether the reflection-impulsivity dimension is a variable in the reading of this population sample, it was essential that a reading test be selected that was not too easy or too difficult for this sample. The Elementary Reading Test from the Elementary Battery of Metropolitan Achievement Tests, Forms F and G, were selected for this study. This test is intended for grades 3 and 4 and consists of the Word Knowledge Test and the Reading Test. The Word Knowledge Test is a 50-item vocabulary test. The authors of the test state in the manual that the words tested were selected on the basis of an analysis of 11 reading series and represent the words that occur frequently in the reading of children in grades 3 and 4. The second part, the Reading Test, consists of a series of reading selections, each followed by several questions designed to measure various aspects

of reading comprehension. The selections are graduated in difficulty through control of vocabulary, sentence length and structure, and overall length. The time limit for the test under the Standard Condition is generous so that little premium is placed on speed of reading. The Word Knowledge Test is 15 minutes and the Reading Test is 25 minutes.

The norms were established as part of the standardization of the entire Metropolitan Achievement Test series. The norms were obtained through a nationwide program in October 1958, in which the tests were administered to over 500,000 students from 225 school systems in 49 states. The norms are based upon analysis of the papers of a random sample of 25% of the students in the standardization program. Tables of standard scores, percentile ranks, and stanines were derived directly from the distributions of raw scores.

Administration of Tests

The Metropolitan Elementary Reading Test, Form F, was administered to 34 third-graders under the Standard Condition (free latency). The test was administered to four groups. Three of the groups had eight students and one group had ten students. The Word Knowledge Test was administered on the first day and the Reading Test on the following day. One week later, Form G was administered to the same children but with an Imposed Latency Condition to

determine if impulsivity affects the reading score of these youngsters. For the Imposed Latency Condition (ILC) the test was administered to five groups. Four of the groups contained seven children and one group consisted of six children. Again, the Word Knowledge Test was administered on one day and the Reading Test on the following day.

The students had some degree of familiarity with the tester as she is the remedial reading teacher in the school. The tester gained rapport with the students and explained that she would like them to help her in an experiment. Form F of the Metropolitan Reading Test was administered to the students under the Standard Condition. One week later, the students were seen again. They were told that they did well on the first test, but that this time a new rule would be added. They would not be allowed to answer each question until they were told to do so.

Four large wall cards were hung in the front of the classroom. These cards contained instructions and self-directed commands. Drawings were used to help emphasize the nature of the wanted response. The students were shown these cards and the tester read them with the subjects. The tester directed attention to the cards and said:

> These cards which you see in the front of the room are going to act as reminders of what you must say to yourself before you begin any of the tasks we are going to do. Please read the first card. It will

help you to understand what kind of experiment this is and what you will be expected to do.

Then one student was chosen to read aloud the printed material on the cards. To reinforce this, the tester said:

> Do you understand? Before answering each question you must Stop, then you must Read carefully, and then you must Think before you make any answer. The important thing is that you must read carefully and think before you answer. Before you answer each question, Stop, Read the choices, and Think. On these questions you will not be allowed to answer until I tell you that it is okay. Are there any questions?

The tests were then distributed, and after completing the pertinent information, the two sample questions were done together. One student read the question. Then the tester directed the students' attention to the cards and reminded them to "Stop, Read the choices carefully, and Think before you answer. I will tell you when you may answer. Answer." If the students tried to answer before permission was granted during the test, the student was admonished with: "Wait, I will tell you when you may answer." Throughout the test the students were reminded of the cards and to stop, read carefully, and think. The length of the latency period was arbitrarily assigned for each question--more time being allowed on the more difficult questions.

After completing the test, the students were thanked for participation in the study and they returned to their classrooms.

CARD 1

INSTRUCTIONS
1. THIS IS A
STOP!
READ
and
THINK
EXPERIMENT
2. BEFORE I START ANY OF THE TASKS I AM GOING TO DO, I AM GOING TO:

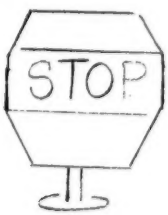
STOP!

READ CAREFULLY

and

THINK! BEFORE I ANSWER.

CARD 2



CARD 3

READ

CHOICES

CAREFULLY!

CARD 4

THINK!

BEFORE I ANSWER

Fig. 2. Illustration of visual reminder cards.

Treatment of Data

This study sought to establish whether or not there would be any difference in reading achievement for this disadvantaged population sample between testing under a Standard Condition and testing under an Imposed Latency Condition where one could control for impulsivity. The null hypothesis, H_o, states that there would be no difference between the scores of the two testing conditions. The hypothesis of this study was that if on a standard reading test one controls for impulsivity by an Imposed Latency Condition, there would be an improvement in the reading test scores.

To see whether any significant statistical difference existed between the two testing conditions, a matched pairs $\underline{t}$ test was performed (Ferguson, 1966):

$$t = \frac{\bar{D} - u}{S_{\bar{D}}}$$

A matched pairs $\underline{t}$ test was performed for the Word Knowledge Test and for the Reading Test and for the total score.

The raw scores for the 34 subjects were converted to standard scores. Then the difference between the mean scores of the two testing conditions was calculated. The mean of the difference scores ($\bar{D}$) was determined by adding up the difference scores and dividing this number by the number of subjects (34). After finding the mean of the

difference scores, the Standard Deviation (S_D) of the difference scores was determined. The formula is:

$$S^2_D = \frac{\Sigma (D-\bar{D})^2}{N-1}$$

where S_D was the square root of the above. Then the standard error of the mean ($S_{\bar{D}}$) was determined. The formula is:

$$S_{\bar{D}} = \frac{S_D}{\sqrt{N}}$$

These statistics were used to calculate the $\underline{t}$ test. The null hypothesis, H_o, can be rejected if $t > t_{33}$ (.995) = + 2.733 or if $t > t_{33}$ (.005) = - 2.733. Thus, if the value for $\underline{t}$ is greater than +2.733, this would indicate that there is a significant statistical difference between the two testing conditions at the .01 significance level.

A $\underline{t}$ test was also performed to determine whether there were any significant statistical sex differences on the pre- and posttests. The $\underline{t}$ test was performed for the Word Knowledge Test, the Reading Test, and for the Total Test. The test statistic used is:

$$t = \frac{\bar{X}_B - \bar{X}_G}{\sqrt{\frac{S^2_p}{N_B} + \frac{S^2_p}{N_G}}} .$$

These data would help to answer the question posed by this study: Will there be an improvement in reading

achievement among disadvantaged students if one alters the administration of a standard reading test so as to control for the variable impulsivity?

CHAPTER IV

FINDINGS AND DISCUSSION

Presentation of Data

This study examined the reading skills of disadvantaged students in an effort to show the effect of impulsivity--immediate action without reflection on the problem posed--as a factor in reading performance of disadvantaged children. The Elementary Reading Test under the Standard Condition was given to 34 third-grade disadvantaged children. They were retested with an Imposed Latency Condition which was structured to counteract impulsivity, as the students were forced to pause and think before answering.

A matched pairs *t* test was performed to test for significant differences between pre- and posttest means for the Word Knowledge subtest, the Reading subtest, and the total test score. Results pertinent to the major hypothesis of the study may be seen in Table 1.

Statistically significant differences existed between the free latency pretest scores and the forced latency posttest scores in the direction of the major hypothesis. The mean Word Knowledge standard score for

TABLE 1

TESTS OF THE SIGNIFICANCE OF THE DIFFERENCE OF THE PRETEST AND POSTTEST STANDARD MEAN SCORES (N = 34)

Tests	Condition	Mean	S.D.	t
Word Knowledge				
Pretest	Standard	61.3	8.06	7.45*
Posttest	Imposed Latency	66.8	7.97	
Reading				
Pretest	Standard	60.3	10.97	6.73*
Posttest	Imposed Latency	66.2	9.73	
Total				
Pretest	Standard	60.3	9.82	10.12*
Posttest	Imposed Latency	65.7	9.58	

* t of 2.733, df = 33, required for significance at the 0.01 level.

the Standard Condition testing was 61.3 and for the Imposed Latency testing 66.8, yielding a t of 7.45 significant at the .01 level. There was also a significant gain on the Reading Test. The standard mean reading score under the SC condition was 60.3 and under the ILC condition 66.2, yielding a t of 6.73 significant at the .01 level. There was a significant statistical overall gain in total test scores. The standard mean total test score for the SC condition was 60.3 and 65.7 for the posttest ILC condition, yielding a t of 10.12 also highly significant at the .01 level.

Table 2 shows improvement in reading by mean grade levels. On the Word Knowledge Test the subjects had a mean gain of over six months going from a mean grade of 3.52 on the pretest to a mean grade of 4.16 on the posttest. On the Reading Test the students had a mean grade score of 3.32 on the pretest and a mean grade score of 4.09 on the posttest with a mean gain of over six months. The total test score showed a mean gain of .64 months.

Table 3 presents the improvement in reading by percentile rank. As indicated on the Word Knowledge Test, the mean percentile was 42 on the pretest and 64 on the posttest with a mean increase of 22. On the Reading Test, the students' mean percentile rank on the pretest was 46 and 62 on the posttest with a gain of 18. For the Total

TABLE 2

IMPROVEMENT IN READING BY
MEAN GRADE LEVELS
(N = 34)

	Pretest (SC) grade equivalent	Posttest (ILC) grade equivalent	Mean gain
Word Knowledge	3.52	4.16	.64
Reading	3.32	4.09	.62
Total	3.50	4.14	.64

TABLE 3

IMPROVEMENT IN READING BY
PERCENTILE RANK
(N = 34)

	Pretest (SC) percentile	Posttest (ILC) percentile	Mean gain
Word Knowledge	42	64	22
Reading	46	64	18
Total	46	66	20

Test score there was a mean gain of 22% going from the 46th percentile to the 66th percentile.

On the Word Knowledge Test, of the 34 students tested, only one student did better on the pretest and four students maintained the same score on the pre- and posttesting. For these students impulsivity was not a hindrance to their functioning on this task. For the remaining 29 students the range of difference scores between the pretest and posttest went from +2 to +12.

On the Reading Test, two students scored higher on the pretest and two students maintained the same score, and here again impulsivity was not a causal factor in their performance. Of the remaining 30 students, impulsivity did affect their performance. The range of difference scores between the pre- and posttests went from +2 to +19. On the total test score, two students scored higher under the Standard Condition and the other 32 students difference scores ranged from +2 to +12.

Sex Differences

A *t* test was employed to test for significant differences between pre- and posttest means for both the boy and girl subjects. Table 4 indicates the results of the comparisons between the boys and girls, and as can be seen, no significant differences were evident between boys and girls on either the pretests or posttests. On the

TABLE 4

COMPARISON OF PRETEST (STANDARD CONDITION) AND POSTTEST (IMPOSED LATENCY CONDITION) STANDARD MEAN SCORES AMONG BOY AND GIRL SUBJECTS

Tests	Boys (N = 16)		Girls (N = 18)		
	Mean	S.D.	Mean	S.D.	t
Word Knowledge					
Pretest (SC)	62.1	6.9	60.7	9.1	0.50
Posttest (ILC)	66.9	6.8	66.7	9.1	0.11
Reading					
Pretest (SC)	59.4	10.8	61.1	11.4	-0.44
Posttest (ILC)	67.6	9.5	64.9	10.1	0.24
Total					
Pretest (SC)	60.1	8.7	60.6	11.0	-0.12
Posttest (ILC)	66.4	8.6	65.0	10.7	0.39

Note: A t value of +2.037 or -2.037, df = 32, required for significance at the 0.05 level.

Word Knowledge Test under the Standard Condition, the boys scored slightly higher with a mean score of 62.09 compared to the girls' mean score of 60.72. Under the Imposed Latency Condition, both the girls and boys bettered their performance. The boys had a mean gain of 4.78, and the girls had a slightly larger gain of 5.95. On the Reading Test the boys on the pretest (SC) had a mean score of 59.43 and the girls 61.05. However, the boys on the posttest (ILC) increased their scores with a mean gain of 8.13 whereas the girls had a mean gain of only 3.83. Controlling for impulsivity had more of an effect on the boys on the Reading subtest. The total test scores were very similar for both boys and girls. Under the Standard Condition, the boys had a mean score of 60.12 and the girls a mean score of 60.55. Under the Imposed Latency Condition, the boys had a mean score of 66.38 and the girls had a mean score of 65.

Discussion of Attitudes of Subjects

The hypothesis that disadvantaged children would perform above their usual functioning level on a standard group reading test when one controlled for impulsivity was upheld. The data support the assumption that many disadvantaged children are hindered in reading tasks that contain response uncertainty because of their tendency to be impulsive where they should instead consider the validity

of their answers. Under the Standard Free Latency Condition (SC), the students responded much faster than under the Imposed Latency Condition (ILC) where thinking time was controlled. Testing time under the ILC condition was twice as long. Many of the students on the ILC testing found it extremely difficult to take the time to think before answering. They wanted to report the first answer that came to them and were not overly anxious about making a mistake. They wanted to get started immediately without directions, and several kept asking if they could go ahead on their own. The subjects were much more tired after the post-ILC testing and felt that they had really worked very hard. Many were obviously not used to considering carefully the accuracy of their answers.

Agreement with Review of Literature

The results of this study lend further support to the current literature on impulsivity. Children have a stable disposition towards either fast or slow decision times to problems with high response uncertainty. One reason for poor performance among disadvantaged students is their impulsive orientation.

Schwebel (1966) found that in the performance of verbal tasks among middle- and lower-class children (ages 9-12 years) the lower-class children responded significantly faster than the middle-class children sacrificing

accuracy for their impulsivity. The lower-class subjects improved their performance considerably on the forced latency subtasks where thinking time was controlled, but the middle-class subjects showed no difference in performance on the free and forced latency subtests. The findings of this present study concur as the disadvantaged subjects did make significant gains on a standardized group reading test when a latency condition was imposed. It would be interesting to do a similar reading study with middle-class children to see if imposing a latency condition on a standardized reading test would make a difference in their scores.

This present data corrobate the results of an earlier investigation by Kagan (1965) in which he administered measures of reading recognition and indexes of reflection-impulsivity to 130 children in grade 1 and again at the end of grade 2. He found that impulsive children (fast response times and high error scores on the visual matching tests) made more recognition errors in reading words presented singly or in a prose selection. For example, there was a positive relation between Matching Familiar Figures errors in grade 1 and partial-identity reading errors at the end of the second grade. This present study deals with third-grade children in a group situation and again shows impulsivity is a variable to be considered in

the reading achievement of primary-grade children.

Schwebel and Bernstein (1970), in their study of the effects of impulsivity on the performance of 18 lower-class boys on four WISC subtests, found that the boys' scores increased significantly under the Imposed Latency Condition. For example, on the Similarities subtest the boys' mean IQ went from 87 (Standard Condition) to 104 (Imposed Latency Condition) with a mean difference of 18, and on the General Comprehension subtest the mean IQ went from 90 to 116 with a mean difference of 26. Studies have shown that impulsivity adversely affects the quality of performance in areas involving concept formation, inductive reasoning, visual recognition, motor coordination, verbal abilities, reading recognition in first and second grades, performance on individual intelligence tests, and performance on the Porteus Maze Test. This study extends the literature and has demonstrated that impulsivity affects the reading performance of disadvantaged third-grade students on a standardized group reading test.

In this study, no statistically significant sex differences were determined on either the pre- or post-testing. In the literature search, many of the studies used only male subjects. In the studies using both sexes, the authors did not find one sex to be more impulsive than the other. For example, Kagan et al. (1966) classified a

subject impulsive if he were both above the median on MFF (Matching Familiar Figures) errors and below the median on MFF response time. A reflective child was below the median on MFF errors and above the median on MFF response. This categorization yielded 25 impulsive and 30 reflective boys, and 26 impulsive and 26 reflective girls. Kagan did find that the girls display greater intertask consistency for the reflective-impulsive disposition. Coefficients were higher for girls than for boys when response time on the MFF was correlated with other response time measures.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

A search of the literature indicated that the variable, reflection-impulsivity, may affect reading achievement. Children who are impulsive tend to report the first hypothesis that occurs to them while the reflective child delays before answering considering the alternative solutions to problems with high response uncertainty. Impulsive responses are often of poorer quality. Disadvantaged children have been found to be more impulsive than their middle-class counterparts.

The question posed in this study was: Does impulsivity affect the reading performance of disadvantaged students on a group standardized reading test? To answer this question, 34 third-grade disadvantaged students (18 girls and 16 boys with a mean age of 9.5) were given Form F of the Elementary Metropolitan Reading Test under the Standard Condition. The students were retested a week later with Form G of the same test under an Imposed Latency Condition to control for impulsivity. They were not allowed to answer until told to do so, and they were

instructed to think over the alternative possibilities before answering. Response time was considerably longer under the post-Imposed Latency Condition than under the Standard Condition where the students could work at their own pace.

A matched pairs *t* test was performed to determine whether any significant statistical difference occurred between the two testing conditions. Data supported the hypothesis. The students scored significantly higher ($p < 0.01$) under the Imposed Latency Condition where they were forced to inhibit their impulsivity on the Word Knowledge Test, the Reading Test, and the Total Test score. A *t* test was also employed to ascertain whether there was any significant differences between the pre- and posttest means between the boy and girl subjects. No significant statistical differences were found between the sexes. Thus, in this study, impulsivity did affect the reading performance of these disadvantaged students.

Suggestions for Further Research

The review of the literature has shown that children do have a conceptual tempo for cognitive products across time and across tasks. Thus, diagnostic testing in the early grades to determine whether a child responds impulsively rather than evaluating potential solutions to the problems posed would be of significant value. For

those students who indicate that impulsivity is affecting their functioning, a program could be instituted in the classroom for training in reflective thinking. Palkes, Stewart, and Kahana's training techniques for hyperkinetic children is an example of the kind of program that might be instituted. Training in self-directed verbal commands on the Porteus Maze Test led to a more careful approach to the solution of a problem rather than to a change in the intelligence of the children. The impulsive child has to be trained to develop voluntary control of his behavior so that reflection becomes a specific conceptual habit independent of the content of the material.

Further research should also explore the generality of this conceptual tempo and the means by which educators can plan curricula which will help develop a reflective style of thinking for these disadvantaged children.

Since this study dealt with a standardized group reading test, further research might explore the effects of impulsivity on performance when children are given individual reading tests. Also pertinent would be further research on impulsivity with older students. Does the problem of impulsivity increase or decrease as the child gets older?

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APPENDIX A

SUPPLEMENTARY TABLES

TABLE A-1

WORD KNOWLEDGE TEST GRADE LEVELS AND GAINS BETWEEN PRETEST (STANDARD CONDITION) AND POSTTEST (IMPOSED LATENCY CONDITION)

Subject	Sex	Pretest grade level	Posttest grade level	Gain from pretest to posttest
1.	M	3.9	5.8	1.9
2.	M	3.5	3.5	0
3.	M	3.2	4.4	1.2
4.	M	3.2	3.5	0.3
5.	M	3.9	4.4	0.5
6.	F	2.5	2.9	0.4
7.	F	2.9	3.9	1.0
8.	F	2.2	2.9	0.7
9.	F	3.5	3.3	-0.2
10.	F	4.4	4.5	0.1
11.	F	3.2	3.5	0.3
12.	M	2.8	3.3	0.5
13.	M	6.7	6.7	0
14.	M	2.7	3.0	0.3
15.	M	3.3	4.2	0.9
16.	F	3.2	3.8	0.6
17.	F	4.4	7.3	2.9
18.	M	4.2	4.2	0
19.	F	3.1	3.8	0.7
20.	F	4.2	4.2	0
21.	F	3.5	4.1	0.6
22.	F	3.1	3.9	0.8
23.	M	3.3	4.5	1.2
24.	M	3.8	4.4	0.6
25.	M	3.6	4.1	0.5
26.	M	3.3	3.7	0.4
27.	M	2.9	3.1	0.2
28.	M	3.0	3.9	0.9
29.	F	3.2	3.8	0.6
30.	F	7.3	8.4	1.1
31.	F	3.0	3.6	0.6
32.	F	2.0	3.3	1.3
33.	F	2.8	3.4	0.6
34.	F	4.1	4.2	0.1
Average		3.52	4.16	.64

TABLE A-2

READING TEST GRADE LEVELS AND GAINS BETWEEN PRETEST (STANDARD CONDITION) AND POSTTEST (IMPOSED LATENCY CONDITION)

Subject	Sex	Pretest grade level	Posttest grade level	Gain from pretest to posttest
1.	M	5.1	5.7	0.6
2.	M	2.9	4.0	1.1
3.	M	3.4	4.5	1.1
4.	M	3.4	4.3	0.9
5.	M	4.2	4.5	0.3
6.	F	2.6	2.9	0.3
7.	F	3.0	4.7	1.7
8.	F	2.6	2.7	0.1
9.	F	3.3	3.5	0.2
10.	F	5.4	5.9	0.5
11.	F	2.9	3.4	0.5
12.	M	2.6	2.9	0.3
13.	M	6.9	8.0	1.1
14.	M	1.9	2.8	0.9
15.	M	2.8	4.3	1.5
16.	F	2.9	3.2	0.3
17.	F	4.9	5.4	0.5
18.	M	3.7	4.3	0.6
19.	F	3.2	3.2	0
20.	F	3.9	4.3	0.4
21.	F	2.8	3.6	0.8
22.	F	3.5	3.7	0.2
23.	M	3.5	5.1	1.6
24.	M	2.3	3.3	1.0
25.	M	3.2	4.2	1.0
26.	M	3.2	3.4	0.2
27.	M	1.9	3.6	1.7
28.	M	2.8	3.0	0.2
29.	F	3.2	3.0	-0.2
30.	F	9.0	8.0	-1.0
31.	F	2.8	3.7	0.9
32.	F	2.3	2.8	0.5
33.	F	2.4	3.0	0.6
34.	F	3.5	4.2	0.7
Average		3.32	4.09	.62

TABLE A-3

TOTAL TEST GRADE LEVELS AND GAINS BETWEEN PRETEST (STANDARD CONDITION) AND POSTTEST (IMPOSED LATENCY CONDITION)

Subject	Sex	Pretest grade level	Posttest grade level	Gain from pretest to posttest
1.	M	4.4	5.6	1.2
2.	M	3.3	3.6	0.3
3.	M	3.2	4.4	1.2
4.	M	3.2	3.7	0.5
5.	M	3.9	4.4	0.5
6.	F	2.5	2.8	0.3
7.	F	2.9	4.2	1.3
8.	F	2.4	2.7	0.3
9.	F	3.4	3.3	-0.1
10.	F	4.8	5.0	0.2
11.	F	3.1	3.4	0.3
12.	M	2.7	3.1	0.4
13.	M	6.9	7.6	0.7
14.	M	2.4	2.9	0.5
15.	M	3.1	4.3	1.2
16.	F	3.1	3.5	0.4
17.	F	4.6	6.0	1.4
18.	M	3.9	4.3	0.4
19.	F	3.2	3.5	0.3
20.	F	4.1	4.3	0.2
21.	F	3.2	3.8	0.6
22.	F	3.2	3.8	0.6
23.	M	3.4	4.8	1.4
24.	M	3.2	3.8	0.6
25.	M	3.5	4.1	0.6
26.	M	3.3	3.5	0.2
27.	M	2.4	3.2	0.8
28.	M	2.9	3.6	0.7
29.	F	3.1	3.6	0.5
30.	F	8.4	9.6	1.2
31.	F	2.9	3.6	0.7
32.	F	2.1	3.1	1.0
33.	F	2.6	3.3	0.7
34.	F	3.8	4.2	0.4
Average		3.50	4.14	.64

ERIC RCS

Metropolitan Achievement Tests Elementary Reading Tests F and B by Wlater N. Durost and others published by Harcourt Brace Jovanovich omitted because of copyright restrictions

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APPENDIX B

STANDARDIZED READING TESTS

COURSE WORK FOR MASTER'S DEGREE IN READING

		Instructor
Fall, 1968		
320:561	Foundations of Reading Instruction	Dr. Fry Dr. Mountain
Spring, 1969		
320:564	Remedial Reading	Dr. Fry
Fall, 1969		
320:565	Laboratory in Remedial Reading	Dr. Swalm
290:501	Introduction to the Principles of Measurement	Dr. Geyer
Spring, 1970		
290:514	Introduction to Adolescence and Adult Years	Dr. Zito
Fall, 1970		
290:509	Emotional and Social Maladjustment	Dr. Bardon
Spring, 1971		
250:573	Programs for the Disadvantaged Child	Dr. Hillson
310:562	Afro-American Studies II	Dr. Proctor
Fall, 1971		
299:566	Seminar in Reading Research and Supervision	Dr. Kling
Spring, 1972		
299:599	Thesis Research	Dr. Kling

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1962-1964	High School English Teacher Scotch Plains High School Scotch Plains, New Jersey
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